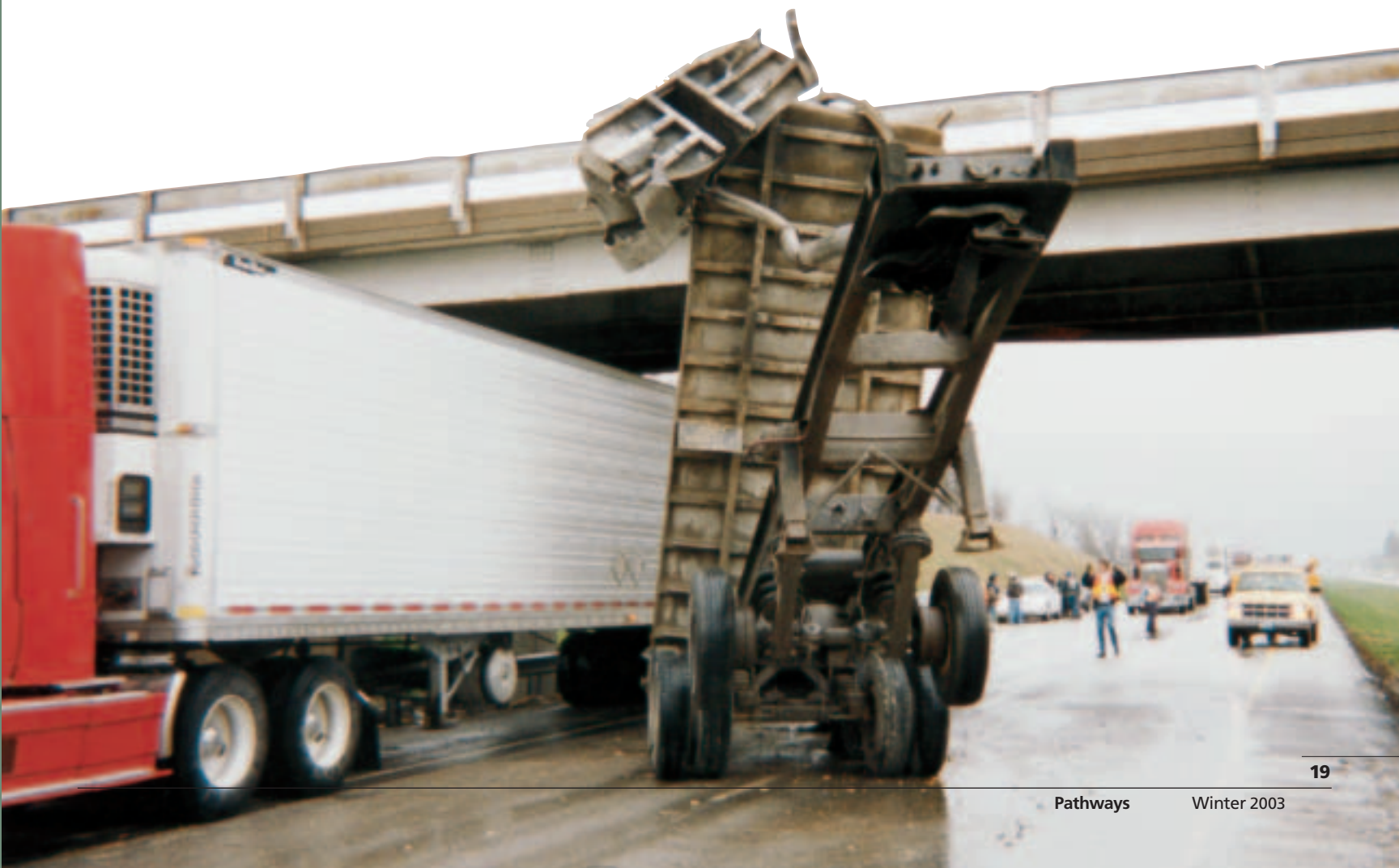
BRIDGE BRIGADE

MoDOT's bridge repair crews make sure travelers stay high and dry

By Melissa Black
Photography by Jerry Goodman

Although they travel by yellow truck instead of spider web, red cape or Batmobile, the Missouri Department of Transportation's bridge-repair crews respond to life-threatening emergencies the same as any hero. Whether it's a middle-of-the-night crisis or a routine repair, this special team keeps Missouri bridges safe and secure.



"In emergency-type situations, it's not uncommon for crews to work 12-hour days for weeks at a time, if necessary."

Danny Schaefer, general superintendent

MoDOT's five bridge-repair crews are part of the Maintenance Unit's Bridge Maintenance section, based out of the agency's General Headquarters in Jefferson City. Bridge Maintenance also includes an inspection staff and four paint crews. With more than 7,000 bridges statewide to inspect and maintain, Bridge Maintenance employees are busy year-round.

But, it's the repair experts who get called out on short notice to analyze and repair a bridge that happens to have a tractor-trailer wedged beneath it.

"MoDOT bridge-repair teams are dedicated to providing rapid emergency response to damaged highway bridges, as well as routine repairs," says Carl Callahan, the department's state Bridge Maintenance engineer. "Crews do most of the emergency jobs themselves, but MoDOT does work with contractors to expedite projects beyond MoDOT's resources."

How Bridge Repairs Stack Up

Since before World War II, MoDOT has employed bridge-repair crews to respond to accidental or natural-emergency situations. The crews work closely with MoDOT district staff, including customer service and public information, to keep them apprised of any restricted bridges.

Annual emergencies have ranged from as many as 19 in 1998 to as few as eight in 1999, and costs per repair vary from as little as $1,000 to more than $1 million, depending on the severity of the damage. Annual bridge-damage costs have ranged from more than $1.3 million in 1998 down to approximately $394,000 in 2001. Comparing the last three years, the annual average cost is more than half a million dollars. Most of that money is collected from the people responsible for the damage. If an over-the-road semi-truck doesn't make clearance, the trucking firm pays for the repairs.

"All damage is different," Callahan says. "We do most repairs, but we don't completely replace structures anymore – that's usually contracted out. We just can't do everything ourselves."

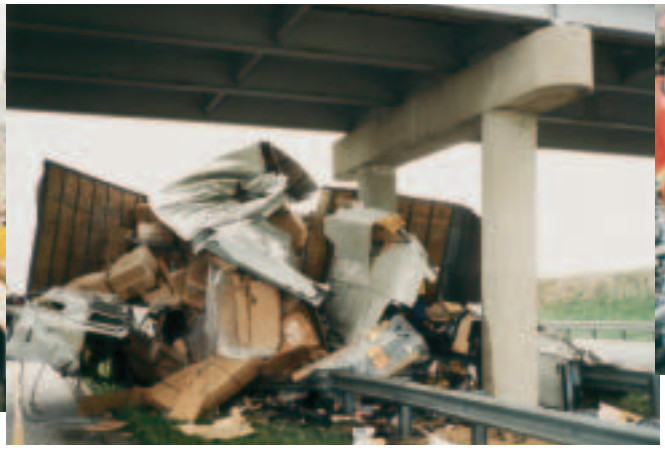
However, according to Callahan, the advantages of having department bridge-repair crews available are numerous: MoDOT crews can respond quicker than most contractors would be able to, crews have the appropriate equipment available to do bridge repairs, MoDOT has greater flexibility for scheduling repairs, and staff have the extensive background and expertise to get the jobs done as quickly and efficiently as possible.

Replacing a timber deck with steel grid on Route J in Camden County

Over and Under

It's the beams and columns under a bridge that keep it standing. When a vehicle crosses a bridge, its weight starts out on the bridge deck, makes its way down to the horizontal steel or concrete beams underneath the deck,

Crews remove a damaged column.



A tractor-trailer and its contents wrapped around a bridge column on I-70

Crew members install rebar for column replacement.

then moves to the vertical columns that support the structure and carry the vehicle weight to the ground. This is called the load-flow path, and, as Callahan explains, anything that disrupts it can cause a bridge to collapse.

"It's not that what we do is more important than other emergency-type situations," Callahan says. "It's just that the work we do is so much more dramatic. Seeing a bridge column split in two really leaves an imprint in your mind."

Call To Action

When an emergency pops up, MoDOT bridge-repair crews jump to action. Maintenance staff in the district where the accident occurs contact the state Bridge Maintenance engineer who works with the bridge-repair general superintendent to organize a team of inspectors to investigate the emergency within a few hours after the incident. If district staff is available, they inspect the bridge to determine if it's safe for travel. The inspectors decide whether to close the bridge or keep it open to traffic. At the same time, the repair crew is dispatched from MoDOT General Headquarters to get to the scene as fast as possible to determine what repairs are needed.

"People could be seriously injured, so we're always going to lean toward the conservative side when we're deciding whether or not to close a bridge," Callahan says. "Although we hate to inconvenience anyone, we'd rather do that than risk anyone's life."

Crew supervisors obtain the original plans for the bridge for specifics regarding beam, column and joint sizes, to ensure the correct replacement parts can be ordered or made from in-stock materials. MoDOT keeps

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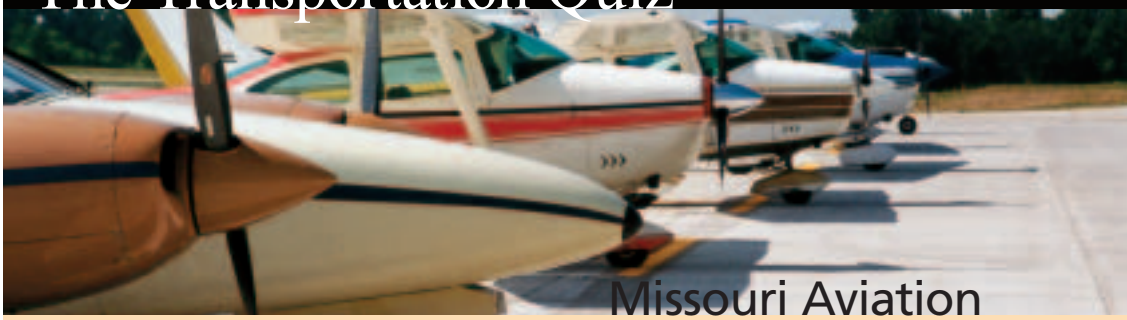
PHOTO BY MIKE WRIGHT

In The Mode
The Transportation Quiz



Missouri Aviation

Approximately 6,200 aircraft and 11,200 pilots are registered in Missouri. MoDOT plays an important role in supporting these pilots and the aviation facilities they depend upon.

Test your knowledge of some of the ways MoDOT helps manage Missouri's friendly skies.

1 How many new airports have been built in Missouri since 1990?

a. One (Lewis County)
b. Two (Sullivan, Warsaw)
c. Three (Bolivar, Clay County, Linn County)
d. All of the above (6 new airports)

2 How does MoDOT fund aviation programs?

a. General Revenue
b. Highway funding sources
c. State Aviation Trust Fund
d. Motor-vehicle sales tax

3 Which public-use airport is owned by the State of Missouri?

a. Skyhaven Airport in Warrensburg
b. Linn Airport
c. Lee C. Fine Airport in Lake Ozark
d. All of the above

4 What is Missouri's busiest general-aviation airport?

a. Jefferson City Memorial Airport
b. Spirit of St. Louis Airport
c. Washington Memorial Airport
d. Bolivar Municipal Airport

5 Which of the following is not a MoDOT aviation-safety program?

a. Turf Runway Marker Program
b. Automated Weather Observation System Program
c. Baggage Screening Program
d. Taxiway Reflector Program

6 Missouri's state role in aviation began in 1945 with which agency?

a. Department of Transportation
b. Highway Department
c. Department of Resources and Development
d. Federal Aviation Authority

7 From 1942-1960 the airport in Malden, Mo., was used as:

a. an automobile race track
b. a U.S. Air Force base
c. a parking lot
d. a landing strip for test pilots

8 How many runways in Missouri are longer than 5,000 feet?

a. 25
b. 20
c. 50
d. 12

9 How many of Missouri's approximately 500 aviation facilities are publicly owned?

a. 437
b. 200
c. 260
d. 115

10 How many people are employed in Missouri's aviation industry?

a. 1,600
b. 16,000
c. 22,500
d. 50,000

Answers: 1 – d; 2 – c; - 3 – d; 4 – b; 5 – c; 6 – c; 7 – b; 8 – a; 9 – d; 10 – b.

Sources: *Talkin' Transportation*; *www.modot.org*

Bob Brendel is the Project Development communications manager at MoDOT General Headquarters.

many replacement parts in stock, but occasionally certain pieces need to be specially made, which takes time and can slow down the repair process.

Routine and Otherwise

"It seems like if you have one emergency, you have three," says Danny Schaefer, general superintendent of the bridge-repair crews. "Everything always seems to happen on Friday afternoon," he jokes. In emergency-type situations, it's not uncommon for crews to work 12-hour days for weeks at a time.

When they're not rushing out to save a bridge, these skilled repairmen stay busy making routine repairs. They'll work on several different bridges in one area of the state for a few weeks and then move on. During the average repair week, crews work four 10-hour days, then return home. But, with 150-160 bridges to mend every year, there's never a lack of work. Crew members also help fix equipment at maintenance buildings.

"There's always something to do in any kind of weather," Schaefer says. "And I always say our guys are jacks-of-all trades," he adds. All bridge-crew members can repair signs, pick up trash and plow snow, just like other MoDOT Maintenance workers. They also receive special technical training. Each crew has members trained in welding, inspection, flagging, work-zone set up, carpentry, hand-tool use, and operation of special equipment like boom trucks, platform trucks and manlifts.

While the long hours, constant travel and being away from home for days at a time are definitely job drawbacks, they're also some of the reasons why crew members enjoy their jobs.

REAL-LIFE DRAMA ON MISSOURI BRIDGES

Crew members discuss plans for temporary shoring on Interstate 44.

After shoring is in place, crews dig around a column to its footing.

A column footing is inspected for damage.

These incidents illustrate how the right training, technical expertise and dedication can make all the difference for highway travelers.

Interstate 44 in Pulaski County

At a few minutes before 10 p.m. on April 5, 2000, a tractor-trailer hit a column on a bridge over Interstate 44 in Pulaski County near Waynesville, Mo. MoDOT district staff alerted Bridge Maintenance about the damaged bridge before midnight, and a bridge repair crew arrived on scene around 1 a.m. to assess damages. The crew supervisor declared the bridge unsafe and closed it for repairs.

Later that day, the crews began building temporary support towers that would allow two of the four lanes of I-44 under the bridge to reopen, while repairs proceeded. The two lanes reopened on April 7, less than two days after the bridge was hit. The crews continued to make permanent repairs, including removing and replacing the entire damaged column.

All four lanes were reopened to traffic on May 3, less than a month after the accident. Estimated repair costs for this project were $170,000.

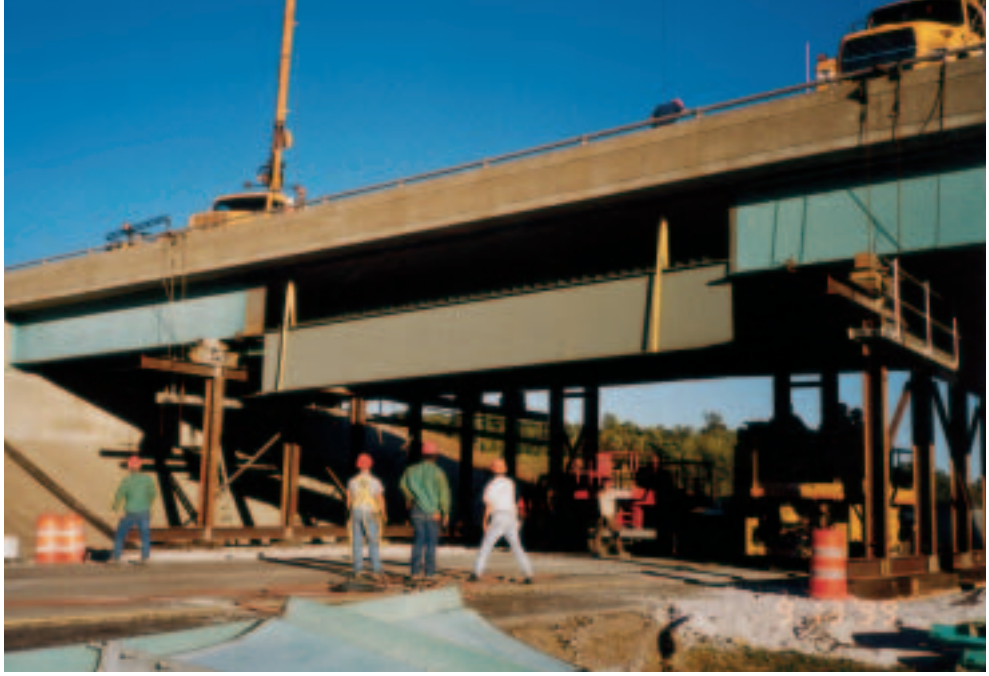
Route 54 in Pike County

Another after-hours accident took place on July 31, 1999, on a Route 54 bridge over Route 61 in Pike County near Bowling Green. A truck hauling a backhoe attempted to pass under the bridge but neglected to lower the backhoe's boom. The over-height load was more than the bridge clearance. The bridge was closed down, because it needed extensive repairs, which included replacing five of the six steel girders that stabilized the bridge.

"Getting to work in different locations, seeing different parts of the state and always having a change of pace keeps things exciting," Schaefer says. "Every bridge is different, and that keeps the work challenging."

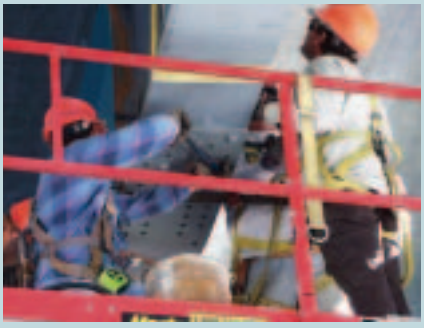
Above all, he notes, "At the end of the day, whether we've been working on a routine repair or an emergency situation, we go home knowing those bridges are still standing and safe for drivers to travel," Schaefer says. "That's a unique feeling." ■

Melissa Black is Operations outreach coordinator at MoDOT General Headquarters.



Damage to girders after being hit by over-height load on Route 54

New girder ready to be hoisted into place



Crew members splice new girders.

With the steel due in by Labor Day, crews set up temporary support towers about three weeks before, while the district set up a traffic detour. Repair crews began replacing the damaged girders the week after Labor Day and completed the job in early October. Estimated repair costs were $315,000.

"Situations like this really show how MoDOT staff is able to perform needed repairs quickly and get a bridge reopened, before an emergency repair contract could even have been put together," Callahan says. "That's real service for Missourians."

Route M in Cooper County

Shortly after lunch on June 22, 2001, a private industry scraper plowed into the vertical supports on the Route M bridge in Cooper County near Boonville. The driver of the scraper lost control of the vehicle as he was driving across the bridge and three of the vertical supports were severely damaged. The scraper was wedged tightly into the metal supports, with one tire hanging over the bridge above the water. The driver had to jump out of the passenger side of the scraper to exit the vehicle.

Inspectors arrived on scene within a couple of hours of the accident, and the bridge was immediately closed. However, because there were concerns about how to extract the scraper from the bridge without causing further damage, it wasn't removed until a couple of days later when a tow truck and a crane were available for use.

Crews needed to install temporary supports and cables to allow them to completely replace the supports. The bridge stayed closed until repairs were completed Aug. 8 for a total cost of approximately $37,000. ■